A GEOLOGICAL AND GEOGRAPHICAL, AND CLIMATOLOGICAL OUTLINE.

Section II.

Our courteous readers are earnestly entreated to keep in mind a clear perception of this fact, that the world-renowned region whose history we are endeavoring to illustrate in some measure, reaches from the Ohio Valley to the Blue Ridge; from the Potomac to the head streams of New River and the Kentucky border.

Intellectual or scientific culture has been so highly developed in our times that for a writer to be up to date in writing up a region like ours, some facts pertaining to its geography, climate, soil, and geology are expected. Geography is a description of the surface as it appears at the present time, while geology takes into account not merely the present surface features but changes that may have affected the surface in the past, with whatever as far as may be known or understood lies beneath the surface.

Like geography, the climate deals mainly with present conditions, but geology opens up glimpses of climate that prevailed ages since. As to soil, when properly studied it will be found needful to know and ap-

ply the teachings of geography, geology, and climatology. Geology first claims attention, being older than present geography or climate.

Geology deals with the opinion, for which reasons may be deduced, or given from known phenomena that there was a time the heat of the earth was so intense that all substances beneath or upon its surface were in a molten state of fluidity, and whirled through illimitable space an incandescent, white-hot globe, composed of all the minerals. Its component elements,—iron, gold, silver, rock, all else whatsoever,—were molten, and consequently the earth was larger than now, and the nights and days were of greater length. After the passage of measureless cycles, the surface cooled forming a crust on the still hot globe that had been sparkling and scintillating, and then was the first appearance of "rock," as the word is now understood.

At this first cooling the surface may have been rough, but there were no mountains of any marked altitude, for the crust was not strong enough to hold up any mountains such as now exist. All underneath still remained melted, and probably for unnumbered years after the crust began to form there was no rain, though the air was fuller of moisture than now. The rocky crust continued so hot that a drop of rain would be instantly changed to steam. But in the course of time the crust became cooler and showers began to form and fall. In respect to this period of our earth's history we have no guide but inferences from the teachings of astronomy, assisted in part by well known chemical facts. All attempts to describe our world at that pe-

riod must be philiosophically conjectural or speculative, and all descriptions would be about as applicable to one part of the earth as another. So far as known to us, no eye but God's ever saw and recognized as such one square mile of the original crust of the incandescent globe in the form it congealed from the melted condition. As the ages rolled away some parts of the cooling earth were broken up by fire, rains, winds, and frosts, and buried other parts with the sedimentary sand thus formed.

There is convincing evidence to the effect that even now the cooling process has not proceeded very far; the surface has only attained a partial degree of coolness, while the interior mass is hotter than the most intense furnace heat. Large areas of the earth's surface have been ffaected by stupendous upheavals and depressions, and these are believed to be owing to the settling down of the solid rock crust in one place and the corresponding uplift in another. There is ample reason for thinking that at a distance of twenty miles or less beneath the surface the temperature would be that of molten iron. There is equally good reason for believing that twenty or thirty miles from the surface of the earth into space, on a line from the earth's centre, a temperature would be reached that the warmest day in those altitudes the thermometer would register a hundred or more degrees below zero.

This should impress us to notice how narrow are the limitations of all human life. Above us in what appears sunny regions, the measureless cold of space; beneath is the fire that feeds on solid rock.

There is geological information to the effect that in a well near Wheeling, West Virginia, the temperature at 4462 feet was 110 degrees; and a descent of less than a mile raised the temperature sixty degrees. In the vicinity of Pittsburg a well five thousand feet in depth had a temperature of 120 degrees. In Germany there is a well 5740 feet deep, which gives a temperature of 135 degrees. From all this it appears that only the outer crust of the earth is cool, and the interior characterized by intense heat.

Upon the crust of the earth becoming sufficiently cool, rains would wash down the higher portions, the sand and sediment thus gathered would be spread over the lower places. This sediment becoming hardened composed the first layers or strata of rock. Some of the oldest layers were very thick at the sea bottoms, and when heated from internal warmth were melted, the stratified feature disappeared, and then they were called "amorphic" or formless rocks. By some granite is regarded as a rock of this kind.

The earth in the process of cooling, shrank in proportion, and the surface became shriveled and wrinkled in folds, large and small. The largest of such folds were mountains, with the seas occupying the depressed places. About that period the first springs, streamlets and rivers appeared, feeling and threading their way wherever the best channel could be found. In the meantime it would still rain and be frosty too, and the rain and frost would attack the higher ridges, and the rocky slopes almost destitute of soil, and the washings would be borne to the seas, forming other layers of

rock on the bottoms, and so the accumulation kept on, with some diversity of rate at times, from that era to the present time 1901.

It comes so near being all, that we say that all rocks in this region were formed in the depths of the ocean; formed of sand, mud, and gravel, or of shells, or of a mixtute of all, the ingredients of which were glued together with silica, iron, lime, or other mineral substances held in solution. These rocks when raised by upheaval from the water formed the dry land, and have been fashioned into valleys, ridges, gorges, and the various indentations of surface seen almost everywhere within the limits of West Virginia.

These primeval rocks are occasionally visible as "bed rock" in streams, and alluvial bottoms, and sometimes forming cliffs and tops of peaks and barren mountains, "bald knobs," and the like. But in our region the underlying rocks for the most part are hidden by soil. At the deepest, however, this soil is only a few feet thick, and were it all cleared away there would be visible everywhere a system of ledges and bowlders, conformable to every height and depression now making up the salient features of the surface; the thickness of these rocks in the aggregate about four miles. To the scientific mind this fact satisfies him, and he feels sure, until there is positive evidence to the contrary, that sand and shells four miles deep, in the past were spread out over the bottom of the sea, and these deposits after being hardened into rock by interior heat, were upheaved, and then arranged and cut into the valleys and rugged inequalities so apparent

to us all in this our day and generation.

Let it be remembered too that this stupendous rock building was not all done at one time, for this region, or much of it, has been several times under and above the sea, especially where the coal measures are found. Across it time after time has the coast line moved back and forth, this being shown by the rocks themselves.

The expert geologist is able to decide from the fossil shells and plants in a stratum the period of the earth's geological history when that layer was formed, and he can, moreover, determine, the oldest and the newest in a series of strata. And yet the fossil shells and plants may not be all at his command, for the position of the layers to one another is often a sure indication of the oldest and the newest, for the sedimentary sands having been deposited in layers one above another, it may be inferred those on top are not so old as the lower, unless it be in instances not usual or common in our region, where strata have been folded so much as to have been broken and turned over. In such an event, the older rocks may be found above the newer.

Unmeasured though the creative ages be, as recorded by the mountains and cliffs of our goodly land, still the most ancient of our visible ledges are young compared with the ledges of other localities in the world at large, or even of contiguous provinces. The Laurentian Rocks of Canada, more than five miles in thickness, formed like ours by the slow accumulation of sandy deposit, yet that series of rock formations was finished up, and possibly partly worn away, ere the first handful of sand, or the first shell of which anything is

now known to us by our rocks, had been placed at the bottom of the Cambrian Sea, under which West Virginia was submerged.

Here thoughts arise that stagger our powers of loftiest imagination. Because of the inconceivable ages required for depositing shell and sand four miles deep astounds the mind, what is to be thought of that vaster lapse of ages, pointing back to the cycles of the young world, all of which was passed, and left their impress in stone, before the corner stones of our Virginia mountains were placed by the architect of the universe. And what is more, this does not certainly bring us to the beginning as yet, for no expert geologist knows it for a fact that the Lourentian rocks are oldest of the layers, and if they should be, still back of them opens that nebulous era, penetrated only by astronomical light, during which the unstratified rocks were in process of formation, from whose pulverized and disintegrated material all subsequent formations have been built up.

The geological eras of special use for our present purpose are the Laurentian, Cambrian, Silurian, Devonian, and Carboniferous.

But meagre traces of the Laurentian period are visible in our State. So with us the Cambrian era is virtually the oldest, and our local interest in geological studies begin with it.

In the Cambrian era, there was a mass of land to the west of us, including what is now Ohio, Indiana, Illinois and beyond. On the east of us was another vast continent of land, reaching from Maine to South Caro-

lina, comprising what is now the Atlantic coastal plain, and extended eastward an indfinite distance, much of it being what is now the basin of the Atlantic Ocean. Between these two bodies of land in the Cambrian era there was a narrow sea from the Gulf of St. Lawrence to Alabama. The trend or line of the eastern coast of that Cambrian sea is believed to have been what is now the general direction of the Blue Ridge range, and so West Virginia was at the bottom of that sea. This sea of ours seems to have survived the Cambrian age, the Silurian, the Devonian, and the Carboniferous.

During the Cambrian age, sand washed from the land forming the eastern coast, spread over the bottom of the sea and formed the lowest or oldest layer of rock found anywhere in West Virginia in anything like abundance. On this rock the West Virginia hills are built or founded. This Cambrian sandstone is so deeply covered as to be seen only in places where it is exposed by the folding of strata, or where rivers have eroded very deeply. For the most part the Cambrian rock is buried thousands of feet under subsequent formations. During the Silurian era the Cambrian sea seems to have commenced receding, and the washings of the uplands, it is probable, began to accumulate on the low plains and widening valleys as a deep fertile soil. In the meanwhile too, over a large part of West Virginia that was still under the sea, thick beds of limestone were formed of shells, mixed more or less with sediment.

Shell fish lived and died in the waters of the Cambrian sea during the Silurian period, and when dead

sank to the bottom. A consideration of this faci explains the diverse origin of sandstone and limestone. Limestone is the product of the sea, while sandstone is of material washed from the land into the sea, by rains and swollen streams. During the period denoted by the close of the Cambrian and the beginning of the Silurian eras, the limestone deposits formed beds from three to four thousand feet in thickness.

Afterwards when that part of the Cambrian sea was separated from the Gulf of St Lawrence by an upheaval in what is now the state of New York the Devonian age was ushered in, which was a wonderful rock builder in the north. In Pennsylvania the Devonian rocks were nine thousand feet thick; in parts of West Virginia seven thousand feet; in southern Tennessee twenty-five feet; and the Devonian rocks disappeared in Alabama.

The sediments forming the Devonian rocks were fine grained, and formed shales, medium sandstones, and some limestone occasionally. When the tedious, wearisome Devonian era came to a close, it was succeeded by the Carboniferous geological age.

It was during the Carboniferous period occured the longest summer that has ever been, when over the northern hemisphere there was no winter, and there was a season of vegetation and plant growth such as had never occurred on earth previously, or would ever occur again, in all probability. It was during this phenomenal summer that our coal fields were formed. In the Carboniferous era the deposits ranged from two thousand to eight thousand feet in thickness in different

parts of the state of West Virginia. Moreover there is evidence that there was during this period a breaking up and redistribution of a vast gravel bar that had been somewhere out of the reach of the waves far since the earlier ages. This aggregation was composed of quartz pebbles, in sizes varying from a grain of sand to that of a cocoanut, all worn and polished as if rolled and fretted in turbulent mountain streams or by the waves on the beach for centuries. By some means or other these pebbles were spread in layers in the depth of the sea, thousands feet thick, and were cemented together forming coarse, hard rocks, and known as "conglomerate," "pudding-stone," "bean-rock," and "millstone grit."

A heavy stratum of those stones forms the floor of the coal formations. It is the opinion of some geologists that the pebbles represent the most indestructible remnants of mountains once abounding in quartz veins, but were washed away before the middle or the carboniferous era.

The hard quartz resisted the grinding process that pulverized the other rocks and remained as pebbles in beds or bars until some great upheaval or depression swept them into the sea and spread them out in layers. Their quantity was simply wonderful, for rocks composed of them cover to a considerable depth thousands of square miles.

The distinguishing product of the Carboniferous age were the coal formations that were placed while the Cambrian Sea was undergoing the convulsions and upheavals that permitted West Virginia to emerge from

the depths of sea and become the "goodly land" it now appears. It was a fearful collision of the elements. The basin of the sea was raised up, became dry land then was again submerged in the deep and gloomy recesses of the Cambrian Sea.

A mighty effort was apparently made by the land to repel the waters that had so long maintained the supremacy. The contest was of vast proportions and long continued. during which first the land then the waves had the advantage.

Backward and forward for hundreds of miles would the Cambrian Sea alternately rise and recede. The struggle was prolonged for myriads of years but finally the land prevailed and the Cambrian billowy contestant in the strife retreated to the west and south as far as the Mexican Gulf.

Victorious West Virginia became dry land and has thus remained to this hour, so well has she maintained her position.

While these changes from sea to land and from land to sea were going on during a part of the Carboniferous age the coal fields were being formed, Unlike the rock formations, coal beds are made above the water or at its immediate surface. These deposites are formed of the trees and plants of varied kinds which grew so excessively luxuriantly during that longest summer time of the ages mentioned elsewhere as prevailing over the northern half of our planet in the Devonian period.

Every coal mine represents some morass, large or small, wherein plants and trees of fabulous size grew,

fell and were buried for ages. The areas in which the coals were in process of formation were probably depressed and occasionally submerged for some thousands of years, and during the submergency sand and mud settled over it and hardened into stone. And when the hardened deposit would be uplifted materials for another coal deposit would accumulate.

This alternation of coal and rocks means an alternate upheaval and submergence of the land, the coal being formed on land, the rocks in the water. This alternation occurred during the period when the Cambrian Sea, successively advanced or receded across West Virginia while the Carbouiferous era was slowly nearing its eventful termination.

There were other geologic periods after the Carboniferous, but they need not be specially noticed in a book like this, because very limited traces remain of their existence in our region. The reason why this should be the case seems to be that after the Carboniferous period West Virginia land was above the sea and therefore no sediment could be deposited to form rocks, and so there would be comparatively little for a lasting record to be impressed.

From the Cambrian age to the Carboniferous, the strata underneath West Virginia becomes thicker and deeper.

From the Carboniferous era to the present era, from the recession of the Cambrian waters, the layers of rock have been modified by the wearing and tearing of the elemental collisions and so the aggregate kept becoming thinner and thinner. And so the strata have been

folded, upraised by subterranean explosions and worn away by the erosive influences of flowing streams. There are places where the Carboniferous have not been worn away; while there are other places where river gorges have reached the lower of the Devonian rocks. In some other localities the vast silurian layers have been penetrated, and in some places the penetration has deeply reached the Cambrian rocks.

As to the glacial age, which was the counterpart of the summer age, during which our coals were formed, but little remains in West Virginia to show that this empire of steadfast, inconceivable cold once swayed its ice sceptre in our region. There is but little reason to doubt, however, that during the glacial era the cold in West Virginia was intense, and there may have been glaciers among the highlands, but all traces wellnigh erased,

Hu Maxwell, a distinguished West Virginia student and writer, seems to have a passion for geological themes, and thus expresses himself:

"When we look out upon our great valleys, the Kanawha, the Potomac, the Monongahela, or contemplate our mountains, rugged and near, or robed in distant blue, rising and rolling, range beyond range, peak above peak; cliffs overhanging gorges and ravines; meadows and uplands; glades beyond, with brooks and rivers; the landscape fringed with flowers and clothed with forests; we are too apt to pause before fancy has time to call up that strange and wonderful panorama of distant ages when the waves of a vast sea swept over all, or when only broken and angular

rocks thrust their shoulders through the foam of the ocean as it broke against the nearly submerged ledges where since have risen the highest peaks of the Alleghanies and the Blue Ridge.

"Here where we now live have been strange scenes. Here have been beauty, awfulness, and sublimity, and also destruction. There was a long age with no winter. Gigantic ferns and rare palms, enormous in size and delicate leaves and tendrils, flourished over wide areas and vanished. And there was a time when for ages there was no summer. But we know of this from records elsewhere, for its record in West Virginia has been blotted out. Landscapes have disappeared. Fertile valleys and undulating hills with soil deep and fruitful have been washed away, leaving only a rocky skeleton; and in many places even this has been ground to powder and carried away, or buried under sands and drift from other regions."

This is about the most about geological themes we have room for in these pages.

Let it be noticed however, before the subject is dismissed, that what has been written about the geological history of our home region may grate somewhat strangely and even harshly on the minds of some of our more devout, Bible loving readers. Unless these readers be superior in mental balance to a great many eminent writers of the remote as well as the recent past, of Biblical interpretation, these readers will feel that such geological views jeopardize the integrity and even the truth of Bible teachings, in the estimation of all persons who may incline to believe geological history of the creation as the writer does.

The expression "In the beginning God created," is capable of two interpretations. One might mean "beginning" in the absolute sense, before all worlds whatsoever,—the "unbeginning beginning," as Augustine termed it. This is the "beginning" of which Wisdom seems to be speaking in Proverbs (7, 22–31), as if that beginning was everlasting.

Then there is another explanation which gives to the phrase "in the beginning" a relative significance. In this sense it would mean the beginning of time, when the creation of matter began, when the heavens and the earth were brought into existence in their first form, and thus it marks the initial time period of history. But the "unbeginning beginning" refers to that mysterious beginning mentioned in the first verse of John's gospel, when the "word was toward God, and the word was God." The "beginning beginng" marks a period when God made a beginning in his governmental relations with the universe, and it is the "beginning" referred to in Genesis; first chapter and first verse.

It should soothe all anxious fears about Bible truth being dimmed by geological facts to remember that the Historic Bible only dates its events from the "genesis" of all things, and its reconstruction from confusion and emptiness when the Spirit of God brooded upon the waters. Bible history passes from creation in the "beginning beginning" clear across inconceivably vast cycles of changes to the period of reconstruction and completion by one single leap. Bible history simply states that in the beginning God created the heavens

and the earth. Then the whole of the creative ages, the geologic periods intervening down to the creation of man, are passed over in silence. When the time arrived for man to appear, then it was God made kosmic order out of chaotic confusion. And here begins inspired history, written by Moses "the man of God," the higher professional critics to the contrary, notwithstanding.

Our worthy readers will please fix this idea in their memories, that there are three initial points to be observed: first the "unbeginning beginning" of John's Gospel, 1st verse; second, the beginning made by God in the creation of the matter of the universe, the heavens and the earth; third, the beginning of the present order of things, with man at the head, as made known to us by Moses. Then moreover the reader will please observe that we not only have history in the Bible but prophecy also.

The historic Bible reveals what we ought to know of the world before the creation of man, while the prophetic Bible reveals what is best for us to know of the hidden future of this present creation, and what is to come after the present creation shall have fulfilled its purpose and shall have passed away. Consequently this truly wonderful Book of all books tells of a palingenesis—a regenesis—of the heavens and the earth—a new heaven and a new earth, wherein dwelleth righteousness.

In Mathew (19, 29) our Lord speaks of the palingenesis, or new order of things to be set in motion and established in the universe.

Peter foretells the heat and fire out of which the earth will emerge in "the day of God."—(2 Peter, 3c).

John with his eagle vision beheld the future and tells of the unbounded and endless life, peace, and happiness of the age yet to come. (Rev. 21, 1–8.)

One of the Wesleys speaks of the Bible in this manner: "The Bible is here as a fact. Only three ways to get here, written by bad men or good men, or by the inspiration of God. Bad men would not write it; good men would not palm off a fraud; and so it must have been written by holy men as they were moved by the Holy Ghost."

Unless the reader be superior in mental balance to a large number of eminent writers on Biblical interpretation, in the more remote as well as the quite recent past, these readers will feel that such geological views jeopardize the influences of Bible teachings on the minds of all who may be inclined to adopt them as true. Now let it be remembered that the phrase "in the beginning God created the heavens and the earth" is susceptible of two interpretations, which have been mentioned elsewhere. Thus viewed, the historic Bible with its "genesis" of the heavens and the earth, leads us to the period when God pronounced the results of His creative ages to be very good.

At this juncture; strangely and mysteriously a something occurred of which Milton speaks:

"Earth felt the wound,
And sighing throughout her mighty frame
Gave signs of woe, that all was lost."

Henceforth the prophetic Bible deals mainly with God's redemptive ages and dealings with man. "The heavens, even the heavens are the Lord's, but the earth hath he given to the children of men."

The Prophetic Bible opens with these words: "And the Lord God said unto the serpent, Because thou hast done this thou art cursed above all cattle, and above every beast of the field; upon thy belly shalt thou go, and dust shalt thou eat all the days of thy life. And I will put enmity between thee and the woman, and between thy seed and her seed; it shall bruise thy head and thou shalt bruise his heel."

Now with its palingenesis and redemptive ages, the prophetic Bible leads us to and leaves us at the place where the "seed of the woman," whose testimony is the spirit of prophecy, proclaims: "Surely I come quickly. Amen." To this the loved disciple responds "Even so come, Lord Jesus." As the seal is stamped and the prophetic Bible closes up, the unending ending is ushered in.

The devout Bible reader realizes that though eye hath not seen, nor ear heard, neither hath it entered into the intellect of man to conceive of the things God hath prepared for those who love him, yet the spirit of the Lord in the prophetic Bible has afforded such glimpses and premonitions that the now unseeable, unhearable, and unthinkable prepared things are virtually revealed. To those receiving what is written with implicit trust, the Bible imparts a hopeful assurance that is unspeakable and full of glory, as well as a peace that passes all understanding. Beloved reader, may it

be yours as well as mine to taste and see that the prophetic Bible is good, as well as the historic Bible.

Let every kindred, every tribe
On this terrestrial ball,
To Him all majesty ascribe
And crown Him Lord of all.

Oh that with yonder sacred throng
We at His feet may fall;
We'll join the everlasting throng
And crown Him Lord of All!

By Him all things consist, and without Him was not anything made that was made.

Passing on from this brief consideration of the geological history of our region, something will now be said of the geographical features for which West Virginia is so widely and justly celebrated.

In forming and modifying the surface features of our state two movements have been at work, one vertical, the other horizontal. The vertical movement elevated extensive areas and formed plateaus not mountains; the horizontal movement folded and doubled up the strata of rocks, and these foldings, when sufficiently large, are the mountain ranges, and in our region both of these movements have acted in the same area.

By a sweep of the imagination let us think of the West Virginia mountains as being so leveled as to form a plain surface. Such a surface when examined would show that West Virginia has a dome-like surface gradually rising from three or more directions.

This imagined surface form, without the mountains, is what has been imparted by vertical upheavals, that have occurred since the Carboniferous age, unmodified by the horizontal movement. This dome-shaped form shows a great swelling of the surface, coming to an apex at the interblending sources of the Potomac, East Monongahela, Cheat, Elk, James, and Greenbrier rivers, for the highest point of the surface must needs be indicated by the varied courses of the rivers, thus showing that the surface through which they flow slopes in various directions.

Now from this imagined surface, with the mountains all brought low, it appears manifestly that even without mountain ranges, parts of West Virginia would be still high, and this being the fact, it becomes interesting to inquire how our mountain ranges were formed, and why nearly all the highest summits can be grouped in a few counties.

The layers of rock were pushed horizontally by two forces, one from the northwest, the other from the southeast. Rains and streams have been disintegrating, carving these mountains so formed by these pushings and foldings, somewhat modifying their original aspects, but leaving their main characteristics. The first upheaval was vertical, and from it the surface of West Virginia assumed the dome-like contour, as has been imagined by us a little while ago. The next upheaval caused by a horizontal pressure folded the layers of rock that formed the dome-like surface, and thus made mountain ranges.

Now if we keep in mind that these mountain ranges

in crossing the original surface after the first vertical upheaval, ran up one slope, across the summit and then down the opposite slope, it is readily understood why there should be so many of the highest points grouped in an area so limited. Measured from the general level of the country where they stand, the West Virginia mountains are from one thousand to two thousand feet in altitude.

The general level itself, however, at the highest part is about three thousand feet above sea level and thus it is a mountain one thousand feet high where it stands on a base three times as high will tower four thousand feet above the sea, and so it follows that the highest peaks in our state are found where the ranges cross the most elevated parts of the plateau or general level. Hence we perceive the reason why the highest peaks cluster about the head springs of the Greenbrier, Monongahela and Potomac Rivers.

The most elevated point in our State is Spruce mountain in Pendleton County, which stands 4,860 feet above the sea.

The lowest point is found in the Potomac Channel at Harper's Ferry, 260 feet above sea level. The difference between Spruce Mountain and Harpers Ferry is 4,600 feet, which difference indicates the vertical range.

The general level of Pocahontas County is about 3000 feet above the sea. Where it enters Pocahontas the bed of the Greenbrier is 3300 feet above the sea, which is 300 feet lower than the point where Shavers Fork of Cheat River leaves Pocahontas.

Among the peaks grouped about the river sources of

our State, the following are in our own county: Bald Knob, 4800; Mace Knob, 4760; Spruce Knob, 4700; Bear Mountain, 4600; Elleber Ridge, 4600; Watering Pond Knob, 4600.

Scientists are not fully assured whether the vertical upheaval that raised the West Virginia plateau, or the horizontal compression that elevated the mountains has yet ceased, or not. On one point, however they seem agreed, and that is the work of tearing down is not at rest. To persons versed in scientific researches and observations it seems very certain that mountains, hills, cliffs, uplands, even the valleys and the whole system of underlying rock must ultimately pass away and their materials be spread over the basin of some sea. Rains and frosts, stormy winds, and unforseen chemical processes will complete the work of disintegration. What seems to the eye everlasting rock will become sand, which will go out with the currents and channels of our rivers until the streams themselves no longer have currents, lost in some all prevailing sea.

As to the climatology of our region, observations and tabulated comparisons show a greater diversity in West Virginia than in almost any other section of the United States of like limits.

West of the Alleghanies the climate differs materially from that east of the range, while in the elevated region between east and west the phases of climate are different from either. The dome-like topographic feature characteristic of the State's surface is largely responsible for this climatic diversity in an area so very limited. As a result the vertical range is over four

thousand feet which places a portion of the land to intercept the westerly currents of air, and another portion to catch the eastern winds, while still other parts are so situated as to be exposed to every wind that blows. As a rule the sections east of the Alleghanies have a warmer and dryer climate. In the mountain localities the summers are rarely very hot if ever, while the winters are usually very cold. Near the highest Alleghanies the thermometer some times falls 30 degrees below zero, while the highest temperature in summer is seldom above 90 degrees.

There are traditional reports of a snow in 1780 in the northwest part of the State that was more than three feet on the level. In 1831 at an elevation of 1000 feet there was a three foot snow between the mountains and the Ohio River. In 1856 at an elevation of 1500 feet there was a forty-two inch snow along the mountains and valleys west of the Alleghanies. Indications of snows six or eight feet deep have been seen near the summits of high mountains, where stumps of trees have been seen eight or more feet high, cut for browse or fuel while the snow was encrusted. In the same region west of the mountains on May 5, 1854, a four inch snow fell. In 1854 the summer west of the mountains was almost rainless.

The dryest summer spoken of in Pocahontas was in 1838. Swamp deposits became so dry as to burn like punk, and when ignited would smoulder and smoke like charcoal pits. June 5, 1859 frost killed almost every green thing in the interior and northern parts of the state. In the Little Levels corn with four or more

blades was frost bitten at that time. Some of it was saved by persons clipping the frosted blades with shears.

As to rainfall the annual average for the whole State including melted snow is about 47 inches. West of the mountains the precipitation is greater than it is in the east, but on the western side of these mountains near the crests is the greater precipitation.

There are two directions whence the rains and snows of this region usually come—the east or the west-south west, while partial or local storms may arrive from any point of the compass. In the main, eastern storms are limited to the region east of the Alleghanies since the clouds that bring the rains come from the Atlantic Ocean. The two systems of rains that characterize West Virginia climatology have for their dividing line the uplands following the summits of the Appalachian Range from Canada well nigh to the Gulf of Mexico. The clouds from the Atlantic move up and over the gentle slope from the coast line of the Atlantic to the mountains, precipitating rain or snow as they float along the air currents. Upon reaching the abrupt eastern face of the Alleghanies, exhausting their force of propulsion, and giving out what remains of their moisture, rarely ever cross to the west side. From this it appears that the Blue Ridge is not sufficient to repel or seriously interfere with the transition of the clouds over their serrated summits, while the Alleghanies are barriers against eastern storms especially. Sometimes there are terriffic rainstorms about midway to the summits as the clouds strike and break upon the rugged

sides, while at the summit little or no rain falls. It was upon such an occasion that persons now living in our county looked down upon from Paddy's Knob, one of notable Alleghany peaks on the northeast border of Pocahontas county. During this terrffic tempest they saw lightning flash and play, heard the thunders crash and reverberate beneath them. It has been observed too that clouds crossing high mountains rarely precipitate much rain on the leeward side of the propelling currents of air.

Let this study of climatology be closed by an inquiry where originate the rains and whence do they come to western part of our State. These rains do not come from the Atlantic for the Alleghanies are in the way of the clouds, and and winds that bring rain to the western section blow towards, not from the Atlantic and repels the clouds from that source of rain supply. It is moreover a well ascertained fact that scarcely an appreciable portion of the rainfall over the world at large is ever taken up from the land. Though it may be true that it matters not where rain or snow is known to fall it is from vapor drawn up by the sun chiefly from lakes seas and oceans. In settling the question as to the rain and snow supply for the western slope of our mountain State, which irrigates the lands to the Ohio and indefinitely the regions beyond, the most available method in reach is to take the bearings of the currents of air on which the clouds are wafted, and trace them to their place of starting. The bearing of these rain bringing currents of air is something west of southwest. In tracing this bearing our readers are led to

the Pacific ocean on the Mexican coast, whence the Equator would be reached in the course of two or three thousand miles. Upon touching the Equator turn at right angles and a thousand miles farther in this southeasterly course, that part of the Pacific would be reached which extends from South America to Australia and most probably that here our readers would find themselves at or very near the starting point whence the winds start on their mission of carrying the rains and the snows that we receive on the western slopes of our state. It would require more time and space to elaborate the evidence that favors this opinion than can be spared in these sketches, so accurate and complicated it is in the scientific observations and inductions required. So let it suffice or satisfy us to know surely that the vast atmospheric systems of currents and counter currents have been traced and recorded on charts until they are nearly as well known as are the courses of the rivers on the continents of our earth.

Reflecting minds are very profoundly impressed when they observe the rains pouring down in summer showers, or the snowflakes gyrating in the wintry storms, by thinking of the distance passed over by the clouds overhead, and the burden carried, that is represented by a sheet of water nearly four feet deep and spread over a surface of twenty thousand square miles. All this too lifted from the South Pacific ocean by the sunbeams and every year borne through the air ten thousand miles and poured in blessed profusion on hill, mountain, vales, meadows, and gardens making them pleasing fruitful and "filling our mouths with good things."

DISTINCTIVE NATURAL FEATURES, MINARAL SPRINGS, STREAMS.—PIONEER METHODS AND SOCIAL CUSTOMS.

Section III

From now on we will devote ourselves strictly to the limits of Pocahontas County, West Virginia. Preliminary words on the outlines of general history, and what was written concerning geological, geographical, and climatological features characteristic of the region wherein Pocahontas forms a conspicuous feature, were all intended to impress ourselves and readers with some idea how wonderfully the lines of habitation had fallen to our p ioneer ancestors in such a remarkable region, and what a goodly heritage is ours could we but justly appreciate it all.

By an act of the Virginia Legislature at Richmond, assembled in 1821, Pocahontas County was formed of territory detached from the counties of Bath, Pendleton and Randolph aggregating 820 square miles. Colonel John Baxter of Stony Creek was very active in bringing about the organization of the new county. Two counties were provided for, one to be named Alleghany, the other Pocahontas. The intention was to name the county embracing the crown of the Alleghanies, "Alleghany," the other lower down "Pocahontas,"

but owing to a clerical oversight the intended names were interchanged.

The geographical position of our county, is defined from 37 degrees 40 minutes to 38 degrees 45 minutes North Latitude; from 79 degrees, 35 minutes to 80 degrees 24 minutes West Longitude. Approximately, Marlinton's geographical position is indicated by the intersection of N. L. 38 degrees 13 minutes and W. L. 80 degrees 8 minutes. The true meridian station mark of sandstone is located in the courthouse grounds 11.9 feet north-east of courthouse steps. The distant mark, north of station mark 957.5 feet on south side of Marlin's Mountain. August 16, 1898, the magnetic declination was 3 degrees, 31 minutes W. Mean annual change 3 seconds approximately.

Pocahontas is an eastern border county' Alleghany top being the line between Pocahontas and Virginia. From the centre of West Virginia Pocahontas county is located to the south-east. Among the distinctive features of the north portion of this county is the fact of its being a part of the high region where nearly every river system of the Virginias find their head springs. The entire county has a great elevation, some of the highest peaks in the State being within its limits. Greenbrier River rises in the north highlands and flows for the entire length of the county through the central portions. Williams River is in the western part of the county, and joins the Gauley in Webster County. In the eastern limits of the county is Knapps Creek, rising in the Alleghany in the vicinity of Frost, and joins the Greenbrier at Marlinton. This junction

of streams, where the bright waters meet, forms the rich alluvial delta where the first corn ripened in Pocahontas, and on which Marlinton is bullding up.

Deer Creek and Sitlingtons Creek from the east; Leatherbark, Warwicks Run, and Clover Creek from the west are important tributaries to the Greenbrier, in north Pocahontas. In central Pocahontas, Thorny Creek and Knapps Creek, with its branches Douthards and Cochran's creeks, Cumming's and Brown's creeks, from the east; Stony Creek and Swago Creek from the west are the main tributaries of the Greenbrier. In south Pocahontas, Stamping Creek and Locust Creek, and Trough Run from the west, and Beaver Creek, Laurel Run, and Spice Run from the east are the tributaries of Greenbrier River.

The Elk region in the northwest is drained by the Old Field Fork, Slaty Fork, and Big Spring Branch of Elk River.

Concerning Knapps Creek, there is an interesting tradition to the effect that it derives its name from Knapp Gregory, believed to be the person of solitary, eccentric habits, who reported to parties in the lower Valley of Virginia that he had seen water flowing towards the west, which report led to Marlin and Sewall's exploration of this region and their locating at Marlin's Bottom, 1749.

The site of Knapp Gregory's cabin is near the public road about opposite Mr Peter L. Cleek's residence, two miles from Driscol. Traces of the fireplace and the dimensions of the cabin yet visible. Early in spring the grass appears here more luxuriantly than

elsewhere and earlier, for the spot seems to be especially fertile, an often observed characteristic of places where buildings have disappeared by gradual decay.

Knapp Gregory is reported to have disappeared from the Creek suddenly and mysteriously. When seen last he was in pursuit of a deer near the Lockridge fording. It was supposed by some that he might have been drowned, while others suspect that he may have been killed and robbed by some suspicious looking characters that had been seen about the same time, by scouts from Augusta County.

East Pocahontas is mountainous and in former years heavily timbered with white pine and much other valuable timber, and abounds in iron ores. Central Pocahontas consists largely of limestone lands, much of it is nicely cleared, and cultivated in grains and grasses. West Pocahontas has more mountains, vast forests of timber of varied valuable kinds, and the indications are to the effect that much coal of great commercial value is ready for development. Heretofore this region was called the Wilderness, or Wilds of Pocahontas, having been, comparatively speaking, an unbroken and wellnigh an impenetrable region.

Throughout Pocahontas County there is such an abundance of purest, freshest waters as beggars all ordinary powers of description. Literally it is a land of "springs and fountains," beyond the dreams of poetic diction to portray realistically. Some of these springs gushing from the earth, even in midsummer show undiminished volume, and with a temperature but little above that of iced water. The entire county

is seemingly underlaid with vast reservoirs, whose dimensions puzzle the imagination, for from the level land as well as from the mountain sides pour forth great springs, many of them with volume sufficient to propel water mills. Larger streams thus starting from a hill-side sometimes disappear, only to appear elsewhere from some unexpected opening in the earth. Of this it is believed that Locust Creek furnishes a notable example in its relation to Hills Creek.

Among the mineral springs for which this county may soon become famous, mention may be made of the Lockridge Spring, near Driscol; the Curry Meadow Springs, at Huntersville. James E. A. Gibbs, the sewing machine lock-stitch inventor, when a young man in delicate health, was employed to build a barn for William Fertig, forty or fifty years ago, a short distance below the Curry Spring. While at work he used the water because it was convenient to get at. To his grateful surprise his health improved and he became a vigorous person, and yet lives to pay a tribute for what this water was the means of doing for the benefit of his health.

The Peter McCarty group or springs at the head of Brown's Creek, four miles from Huntersville; the Pritchard and Price Springs at Dunmore, three miles from Forrest Station on the Greenbrier Railroad; the Spring-House spring near the head of Clover Creek. All these Springs have a local reputation for remarkable cures and they seem to be analogous in their properties to the Capon Spring in Hampshire County.

Dr J. B. Lockridge had Prof Mallett, of the Vir-

ginia University, to make a qualitative analysis of the Driscol Spring. Like the Capon Springs, the Driscol Spring has been found to contain silicic acid, soda, magnesia, bromine, iodine, and carbonic acid, and therefore good for bathing and drinking, promising relief for rheumatism, gout, dyspepsia, dropsical affection, calculus, and renal troubles. Within the radius of a mile of Dunmore are the Moore Blue Sulphur spring, the Kerr magnesia, and chalybeate water.

Near Edray several mineral springs are known and for more than fifty years have been used with beneficial results, such as the Warwick sulphur, Duffield chalybeate, Duncan's chalybeate, and Smith's magnesia, on the west branch of the Indian Draft; Clover Lick Salt Spring, Moore's magnesia Spring, near Marlinton; Moore's alum spring, or as some call it, natural lemonade spring on Brown's Creek. On Laurel Run, four or five miles, east of Hillsboro, is a remarkable group of springs, consisting of a fresh water spring and a purple sulphur spring welling up from the same rock within a radius of a yard or so. The effects of these springs used to be the wonder of the gossips and wet nurses fifty years ago.

In the matter of natural scenery Pocahontas County can display some charming mountain views from points like Droop Mountain Summit, where the Lewisburg Pike reaches it and overlooks Hillsboro and vicinity; Gibson's Knob, overlooking Clover Lick, a point from which, under favorable conditions of weather and sky, House Mountain in Rockbridge and the Peaks of Otter

may be discerned. Several years ago, about the time a new tin roof was placed on Lexington Court - House the late William Gibson saw saw the scintillations of reflected sunlight. The distance to Lexington is about eighty miles; Peaks of Otter, one hundred and ten. Grassy Knob, near Greenbank; Paddy's Knob, east of Frost; Kee Rocks, and Buck Knob, overlooking Marlinton, and the High Rocks, overlooking Millpoint and vicinity; the "Bend," overlooking Edray; Mount Secall, overlooking the Hills and Knapp's Creek Valleys; Briery Knob, that looms up so visably in lower Pocahontas, all afford prospects to be appreciated must be seen and enjoyed. The sunrise prospects challenge description worthy of the best endeavors of Ruskin or a Maurice Thompson to put in words.

Some four or five years since two ministers had occasion to travel over the Drooping Mountain at an early hour. This mountain overlooks much of southern Pocahontas and northern Greenbrier, commanding an entrancing view of Hillsboro and its charming rural surroundings of Groves, fields and orchards. It was very misty on the morning referred to, and as the ministerial equestrians passed from Hillsboro their view was shut off on every side by the dense vapory barriers. They slowly ascended the broad but devious road up the mountain side towards the summit. Upon reaching the crest of the mountain the sun was seen some hours high in all its glorious power and light. If the Psalmist had been there he would have spoken of the sun as a bridegroom coming out of his chamber and rejoicing as a strong man ready to roll

away the mists that were over the hills, the vales and streams, keeping them from view. We paused at the point most favorable for our outlook, and time was spent contemplating the scene, feeling that we knew of no words that would at that moment fitly express our emotions. In the meantime a radiant power more than ninety million miles away had come and was working miracles all about us. The vast surface of the lake-like cloud beneath our feet began to rise and roll like the waves of a miniature ocean, and the sunbeams beautified all these white waves. They seemed to gather themselves into Delectable Hills, and from their radiant tops spires of vapors enchanting with nameless beauties reached upward towards the sun. And as one would tower above others near, it seemed to draw them along with itself till all had vanished in upward viewless flight. Drops of dissolving mist were on the leaves. Like pearls they hung the bushes with brilliants, and shone like diamonds on the grass.—Had that morning been without cloudy mists, the morning scene would have been divested of more than half of its unspeakable beauties and suggestive lessons. Such a scene as was witnessed by those ministerial friends on Drooping Mountain was well fitted to remind them, and all others who pause, and think upon like morning scenes amid our mountains, of the fact that it was when alone upon a mountain that Elijah saw the glory of the Lord. It was when alone upon the mountain "the Lord spoke unto Moses as a man speaketh unto his friend. Then and there Moses received the promise of final rest. A piously intelligent person while

visiting alone, the mountains of Switzerland, wrote in this manner to friends at home, "It is good to be among the mountains alone—good for both the mind and heart." It seems to be almost universally conceded that mountain solitudes are very conducive towards developing elevated types of piety rightly improved. By this, however, is not meant that christians or those desiring to be christians are nearer to heaven, in place, upon mountain tops than in their homes in the valleys and chambers for secret prayer, though on the mountain tops they be seemingly and impressively nearer the blue sky and its starry gems. When the mind is in a devotional receptive mood there is something very congenial between the mountain tops and prayer and spiritual glory.

Where every thing seems to be more or less unique, as in Pocahontas, natural curiosities individually do not cut much figure, yet special mention may be made of the cliffs at the end of Droop Mountain, which have but recently become famous, and will be one of the features of tourists entering our county by rail up the Greenbrier; the "Ice Cave" of Droop Msuntain. the "Cranberry Meadows" west of Hillsboro; the Falls of Hills Creek; the Turkey Buzzard Cave, near Mt Vernon, the Black Hole near Linwood, the Saltpetre Cave at the head of Swago Creek; the Overholt Blowing Cave, surpassing the historic Windy Cove of Old Millboro in Bath, near McClintic's Mill, four miles from Marlinton; the stone footlog and rock parlor table at the head of the Dry Branch of Swago; the Buttermilk Spring on Gauley, about opposite Gibson's

across the mountains; and "Gun Boat Rock," near Split Rock.

Killing frosts early and late made tha working of land a precarious source of subsistence until a comparatively recent period in the history of our county. As late as 1810, the fact that corn would ripen at Marlin's Bottom enough to be fit for meal was nearly a year's wonder. Gardens for onions, parsnips, cucumbers, pumpkins, and turnips; patches for buckwheat, corn, beans, and potatoes, for many years comprised the most of pioneer farming enterprise in the way of supplementing their supplies of game and fish. The implements used for clearing and cultivating these gardens and truck patches were of home manufacture, and for the most part rather rudely constructed, as mere makeshifts are apt to be.

The people were very frequently molested when at work, by the Indians. And on this account the men would carry their guns with them and have them always in ready reach, and while at work they would be on the look out lest cunning scouts in ambush would shoot them down while at their endeavors to win their living in the sweat of their faces.

It being scarcely possible to keep a work horse because of the raiding Indians, most of the labor of farming had to be done with hoes. In course of time when horses and oxen could be kept and used, plows were in demand. The first plows were made entirely of seasoned hardwood. An improvement was made by attaching an iron plate to the plowing beam, and the "shovel plow" was evolved.

To smooth and pulverize the earth for planting, the place of the harrow was supplied by a crabapple tree or a blackthorn bush, pressed down by heavy pieces of wood fastened on by hickory withes or strips of leatherbark, and some nice work was done by these extemporized harrows. The first harrows that superseded the crab and blackthorn, had wooden frames shaped like a big A, and the teeth being made of seasoned hickory or white oak.

The first scythes that were used to cut the meadows were hand-made by the neighborhood blacksmith, and were hammered out instead of whetted to put them in cutting order. The sneathes were straight sticks, and in mowing the mowers were bent into horizontal, semilunar fardel shapes, as if they were looking for holes in the ground, or snakes in the grassy weeds.

For handling hay or grain, forks were made of bifurcated saplings of maple or dogwood, carefully peeled and well seasoned. The writer remembers with pleasure a dogwood fork presented to him by his father, and this fork compared with the hickory rod kept in pickle for lazy, absent-minded boys, was a thing of beauty and the joy of many a summer day in the meadows. It became smooth as ivory, and was the last of wooden forks I have ever seen used, and the last shocks I built with it were in the meadow just above the Island, more than fifty years ago.

When the pioneers came to need more land than mere patches, they would chop three or four acres "smack smooth" and a log rolling was in order. By invitation the neighbors for miles would meet with

their teams of horses or oxen, to assist in putting up logheaps for burning. This being done a feast was enjoyed, and all returned homewards.

The next thing was to burn the heaps. Outside the clearing a wide belt was raked inwardly to prevent the fire from "getting away." The preferred time for using fire was usually some night when all would be still and calm. The first thing was to burn the clearing over, thus making way with smaller brush, undergrowth, and other "trash." It was an impressive sight to witness as the smoke and flames of the burning heaps arose like pillars of fire by night, while the men, sweaty and sooty, passed among them keeping up the fires.

Another interesting pioneer social gathering was the "raising" of the dwelling or a barn. Nothing pecuniary was expected, simply a return of like service when notified. "Huskings" were popular at a certain period. In some communities they would come off in the day as a matter of business, not recreation or frolic. But the typical "husking" was prepared for with some elaborate preparation, The ears would be pulled from the stalks, husks and all, and placed in ricks. This "husking" usually came off on some moon lighted night. A managing "boss" was chosen who arranged the men on opposite sides of the rick, and the contest was who would be the first to break over the crest line. Finding a red ear was considered good luck and so every ear would be noticed as it was broken off. Whoever scored the most red ears was the champion of the "husking bee." While the fathers and sons were thus

laboriously but joyously disporting themselves at the corn ricks, the mothers and daughters were gathered at the house, some cooking, others busy at the "quilting." About 10 or 11 o'clock the "husking" and the "quilting" were suspended, supper served and then came the "hoe down," wherein heavy stumbling toes would be tripped to the notes of a screeching unruly violin, such fiddling was called "choking the goose," or when there was no fiddle in evidence some one only "patted Juba" about as distinctly as the trotting of a horse over a bridge.

As a rule pioneer festivities were orderly, yet once in a while there would be a few persons at the huskings who prided themselves in being and doing ugly. Somewhere about the premises there was some body or some thing that they would speak of as "Black Betty." After a few clandestine visits to where "Black Betty" was, the consequences would be that colored Elizabeth with her songs, yellings and a few fights would get in her work, and thereupon a fistcuff or two would impart interest to the gathering, and make the occasion the talk of the neighborhood until some other exciting matter came around.

In the early times now under consideration it was an essential matter that about every thing needed for comfortable use about the home should be home made or at least somewhere in the immediate neighborhood. Thus it came that pioneer wives and daughters were not only ornamental but exceedingly useful in promoting the comforts and attractions of their homes by the skill of their willing hands. Every household of any

pretentions to independence or thrift had a loom, spinning wheels, little and big, a flax breaker, sheep shears wool cards, and whatever else needful for changing wool and flax into clothing and blankets.

Sheep were raised on the farms and were usually sheared by the girls and boys. The wives and daughters would thereupon scour, card, spin, weave and knit the fleeces into clothing:

The flax was grown in the "flax patch," usually a choice bit of ground. When ripe the flax was pulled by hand, spread in layers until dry upon the ground where it had been pulled, then bound in bundles, carried away and spread very neatly over the cleanest and nicest sod to be found, most commonly the aftermath of the meadow. Here it remained with an occasional overturning until it was "weathered," or watered. After an exposure of three or four weeks, or when weathered completely, the flax was gathered, bound in bundles, stored away in shelter until cool frosty days in late fall, winter or early spring would come, when it would be broken by the flax breaker, then scutched by the scutching knife over an upright board fastened to a block. Then what was left of the woody part by the breaker and scutching knife would be combed out by the hackle, and was now ready for spinning and weaving as flax or tow. The tow could be held in the hand and spun for coarse cloth, "tow linen." The flax, being the straight and finer fibre, would be wrapped to the "rock," attached to the little wheel and spun for the finer fabrics. The rock was a contrivance made by bending three or four branches of a bush together and

tying them into a kind of frame-work at upper end. Flax was most commonly put through the entire process from planting to wearing without leaving the farm on which it was grown.

The growing of wheat in Pocahontas in quantities sufficient for self-support was not thought of in early times. Ploughed in with the the bull tongue or shovel plow, brushed over by a crab brush or thorn sappling, and in many instances simply laboriously dug in with a hoe, it was a precarious crop, owing to freezing out, blight or rust. The harvests were gathered with the sickle. The reaper clutching a handful of grain in his left hand would sever it with his right. The handfuls were bound into sheaves and then stacked into dozens. Ten sheaves upright with heads pressed together and all sheltered and kept in place by the other two sheaves being broken at the band and spread out like fans and laid over the top. These dozens having dried out were carried by wagon or sled and stacked. When on steep ground the dozens would be brought off on stretcher shaped contrivances attached to a man's shoulders. At first the threshing was done by flail, and fifteen bushels was a good day's work. In value one bushel of wheat was equivalent to two bushels of corn, and exchanges were made on that ratio. Where crops were comparatively large flailing was superseded by "tramping out" by horses freshly shod. In this innovation the half grown boy was much in demand as he could ride one horse and lead a second. Two or three pair of horses would hull out forty or fifty bushels per day. After tramping awhile the horses would leave the floor and

rest while the straw would be shaken up and turned over, and then the tramping would be resumed until the grain was all out. In separating the wheat from the chaff the first method was to throw shovelfuls up when the wind was high to blow the chaff away, and then the wheat was cleaned by a coarse seive, which was shaken by hand, and the chaff would come to the top and raked off in handfuls. This was improved on the "winnowing sheet," usually worked by two men, while a third would shake the wheat from a shallow basket. Finally the "winnowing sheet" gave way to the windmill or wheat fan, when the farmers became so advanced in circumstances as to feel themselves able to pay thirty or forty dollars for one.

After "horse tramping out," came the threshing machine, and the sensation produced by its advent surpassed anything that has ever occurred in our county, unless it was the coming of the cars, the 26th of October, 1900. This machine, known as the "chaff-piler," was introduced about the year 1839, by William Gibson, of Huntersville, W. Va. It was operated by Jesse Whitmer and John Galford, late of Mill Point. It was a small affair, simply a threshing cylinder in a box, propelled by four horses, and when in operation the wheat would fly high and low as if it was all in fun. An immense sheet was spread on the ground, and this was enclosed by a wall of strong tent cloth about eight feet high, on three sides. A person with a rake removed the straw as it came out. He would have his face protected with heavy cloth, for the wheat grains would sting. After the "chaff-piler"

came the separator, at first propelled by horses, and then more recently by steam. At the present time most of the crops are separated by the "steamers."

When it came to be possible to raise corn fit to eat in the limits of our county, its preparation for the table was a matter of prime importance. One of the earliest contrivances was the "hominy block." This was made from a large block of some hard wood, most commonly white oak, eighteen or twenty inches in diameter, hollowed out at one end by burning and then trimmed into the shape of a druggist's mortar of huge proportions. For burning out the cavity a hole was bored by a two inch auger, then a red-hot bolt of iron was inserted. This iron bolt was frequently a coupling pin of a wagon. When this could be used no longer to advantage, then hard dry wood—elm was preferred—was obtained, and a fire was kindled in the hole and kept burning until the cavity was of the desired size. The top was large, but it narrowed down until it assumed a funnel shape, and held a peck or more of grain. The grain had been slightly softened by soaking in tepid water, and was reduced by the use of a wooden pestle, usually made of tough material thick as a man's wrist, an iron wedge inserted at one end, made fast by an iron band.

Pounding corn for a family of eight or ten persons was an all day business, and part of the night on Saturdays. When pounded the grain would be in a more or less fine condition, and by using a seive made of deer's skin stretched over a hoop and perforated with holes, before the wire sifters were known, the coarse

and fine could be separated. The fine meal would do for "johnny cake," which is derived from "journey-cake," baked on a board, and for bread, while the course could be either repounded, or cooked as it was for hominy.

After a time this wearisome pounding was alleviated by a sweep pole; superseding the hominy mortar and sweep pole was the hand-mill, formed of two circular hand-stones. The lower was the bed-stone, the upper was the runner, and both were closely fitted by a wooden hoop, in which there was an opening for the discharge of the meal. In the runner there was a central opening into which the grain was fed. Another opening was drilled near the edge of the runner, into which one end of a pole was fitted, while the other end was put through a hole in a board fastened to the joists above. With one hand grasping the upright pole, the miller turned the runner, and with the other fed the grain into the central opening. The grinding of one bushel was counted a day's work.

Hand mills served their purpose, and tub-mills—the first water mills—came into use. In the tub-mills, the upper stone was stationary while the lower one turning against it reduced the grain to meal. The plan of construction was this: A perpendicular shaft was fixed in the lower stone or runner, and on the other or lower end of the shaft was a water wheel four or five feet in diameter. This wheel being sunk in a stream of water, its force caused the wheel to revolve and thus turned the stone fixed to the upper end of the shaft.

After the tub-mills came the "grist mills," with the

horizontal shafts, the lower stones stationary and the upper ones the runners.

In thinking over what has been written concerning pioneer farming experiences, the writer feels safe in saying that if the successors of these early settlers could see and handle the rude and clumsy, hand made appliances devised and used by the pioneer busy hands in their toilsome, dangerous endeavors for a livelihood they would be greatly surprised, and would be prone to regard them as implements of sorely tedious torture, were they compelled to make use of the same in their bread-winning pursuits in 1901.

It would be a serious mistake however to think in that way of our worthy forbears, because they passed many hours of genuine enjoyment. Their fewer wants easily satisfied, rendered them as well contented, if not better as a rule, than their descendants now living their strenuous lives in pursuit of luxuries of dress, housing, and food that would have been the envy of princes and kings in pioneer days.

So far as tested, all the cereals now produce large yields in Pocahontas County. Wheat, corn, rye, oats, millet, and buckwheat may be produced in ample abundance. Though there be quite a number of good mills, yet they are so located that there are communities who think it to their interest and convenience to carry their wheat to the Warm Springs or Monterey to be ground, and considerable is imported, owing to its being cheaper than the home product.

The climate of this county has passed through a great change the past eighty or ninety years. About

that long since it was a rare thing for corn to ripen anywhere in the region now forming the limits of Pocahontas. While it may be true that considerable corn was planted, yet the intention was to have merely soft corn, to fatten a beef or pork in case the mast failed, or be scarce.

About 1810, Major William Poage, then living at Marlin's Bottom, (now Marlinton), had a field of corn near the mouth of the Creek that was looking very promising. He was asked by a neighbor how much corn fit for bread did he think he might have from that splendid looking field. Major Poage, after some thoughtful hesitation, replied very cautiously that he ventured to think there was a probability of there being eight or ten bushels. This was spoken of as the marvel of the season, that out of three or four hundred bushels of corn raised at Marlin's Bottom, there might be eight or ten fit for bread, johnnycake, pone, and hoecake, and the happy people thought things now looked like living.

It is within the memory of living persons when ripe corn was the seldom exception, not the regular rule, on Elk, where fine crops are the rule of everything that is eatable, and that too in notable abundance and of prime quality.

As the climate and soil now are in Pocahontas, they are found to be adapted to the production of tobacco of a very good quality, and for most of the staple fruits, specially the peach and apple.

In the limestone belts bluegrass grows spontaneously and there are places where the bluegrass sod rivals the

famous Kentucky bluegrass. To use the language of an unknown writer, "Timothy, clover, and numerous other choice varieties contest the right of the bluegrass to the field; so we find them growing together, each trying to choke out the others and to climb high enough to choke out all the rest." So far as is observed, this bluegrass producing sod is common over the greater part of the county, and there is but a small percentage of its territory where grasses may not flourish. As a result a great deal of livestock has been and is produced. The cattle, for marketing qualities, equal any in the State. Pocahontas mutton has a reputation peculiarly its own, and the genuine commands the best market figures. There have been times, and to some extent such is the case now, where buyers from other States have come and canvassed Pocahontas County for live stock, seemingly not willing to wait until the cattle or sheep could be taken to them at their homes. Blooded horses equal to the best for quality and service, have been raised in this county.

It is believed that when the lumber enterprises shall have finished their operations and the lands no longer wanted for the merchantable timber, there will be still grander opportunities opened up for farming, fruit producing, and stock raising, and then Pocahontas may rank among the best in any of the States in that line of home making and industrial endeavor.

Very much of Pocahontas was heavily timbered and as the variety and quality was equal to most and surpassed by no other county in the State, before the vast inroads were made on these timber resurces in the last

fifteen or twenty years. Still there is an enormous supply yet remaining after all has been done by rafts, drives and loaded freight cars. For twenty years or more an interesting feature were the lumber camps here and there in the woods where hundreds of men were comfortably housed and fed on the fat of the land in various parts of the county, mainly east of the Greenbrier. On the higher elevations west of the Greenbrier and in the western and north-western part of the county are vast reaches of black spruce forests, now in such demand for wood pulp of which the paper is made for post cards, books and newspapers. There remains much oak, cherry, poplar, chestnut and the more common forest trees in marked profusion. The value of timber standing not long since was estimated at over two million dollars.

During the construction of the Greenbrier Railway the past two years (1899–1900) several quarries of sandstone were opened along the line or nearby, and the material pronounced equal to the best for construction purposes.

For burning and fluxing purposes limestone is very abundant, and much of it lies very near vast iron ore deposits.

Near the Little Levels in south Pocahontas very pretty marble has been found, and the mountains on the west of the Levels contain vast amounts of black and white marbles. The specimens of which are very beautiful and promise great commercial value. These formations may be of ready access to the main stem of the Greenbrier Railway by short tramways from See-

bert and Locust, and possibly points intervening.

The entire county from end to end east of the Greenbrier abounds in iron ore indications, principally the brown hemetite and the reddish fossiliferous. The fossiliferous is not in thick veins or very widely distributed, but of the brown hemmetite the supply is regarded as virtually inexhaustible. The veins of ore are large, of excellent quality and distributed over a vast area. In character the ores are pronounced the same as the ores of Monroe and Greenbrier counties. The ore veins of these counties are regarded as extensions of the veins found in Pocahontas.

As to coal resources but little, comparatively, has as yet been ascertained by actual development. While some investigations have been made, but very little coal has been mined for home use and none for exportation. In west Pocahontas in the Gauley and Williams River region, there is a large area underlaid by the New River coking coal veins ranging from two feet thick to eighteen feet, and as far as tested this west Pocahontas coal proves equal to the New River coaking coal. This is the coal that has made the New River region in Fayette County and the Mercer or McDowell coal districts farther south so renowned as coke producing localities. This West Pocahontas county coal is about, as to mileage, the nearest coking coal to the iron producing centres of the two Virginias. Railway transportation and mine development seem to be all that is wanted to bring about a lively demand for this coal. Transportation and development appear now from current enterprizes to be questions of only a short time.

As to the means of travel and communication in pioneer times, it seems that for years the pass ways to and from places in our county and elsewhere beyond were the trails made by buffaloes and Indians. At first the brush was trimmed away and widened for packhorses, then for sleds, then for wagons, as progress required. The pioneers seem to have noticed that it would be advisable to avoid the trails along the streams and valleys, and follow the crests of leading ridges, and so new paths were blazed accordingly and came to be used, hence the steepness of the old roads may be accounted for in great measure. It was much more practicable to escape an ambuscade on a crest or summit, than when hemmed in by a valley hill sides. With a tenacity worthy of a better purpose the pioneers clung to the old paths with marked conservatism. The sons prided themselves with the idea that what was good enough for their fathers was good enough for them. About 1836, however, there seems to have been an awakening on the matter of better roads to and from the county. The Warm Springs & Huntersville Turnpike was projected, and completed about 1838, with Henry Harper and Wm. Gibson, a Huntersville merchant, contractors. It was a grand high way for that period, and awoke a sensation much like our people felt at seeing cars coming to Marlinton. Every stream was bridged from Huntersville to the Warm Springs, and the means of communication at the time between those places seemed to be all that was desired or could be reasonably expected. Capt. William Cackley was in the Legislature that authorized

and chartered the road, and, to use his own terse language, he had a "time of it log-rolling his bill through;" the expletives are here respectfully omitted.

The Staunton and Parkersburg Pike was made two or three years later. It was located by the celebrated Crozet, one of the great Napoleon's loyal engineers, who refugeed to the United States after Waterloo had made it rather uncomfortable for him in the old country.

About 1854 the Huttonsville and Marlinton Turnpike was located by Engineer Haymond. In the same year he engineered the Lewisburg and Marlinton Turnpike, and the Greenbrier Bridge at Marlinton. Colonel William Hamilton, of Randolph County, contracted for the road work from Huttonsville to Marlin's Bottom. Lemuel Chenoweth, from Beverly, built the bridge in 1854,-56. Captain William Cochran superintended the Lewisburg Road, and all of these enterprizes were completed by 1856. During the war between the States these highways, like so many other things, were virtually laid waste. The efforts to repair and keep them in proper condition have been many and varied, and much unfriendly criticism evoked as to the policy and management of the county authorities. As to road affairs, times change and people with them, and it seems citizens need time for living and learning. No doubt the time will come sooner or later when the interests of the public highways will be committed to the management of persons specially qualified for the business, like law, medicine, or politics.

As mountains and grasses are so characteristic of

our county, some reflections as to the part they perform in their Creator's plans may be in place. The hills and monntain, of Pocahontas, when contrasted with people who own them as property and live in homes overshadowed by them, seem as to existence "everlasting hills." Yet the truth is these mountains are just as perishing as we are. Their veins of flowing fountains weary the mountain hearts as the crimson pulses do ours. The natural forms of the iron or stony crags are abated in their appointed time, like the strength of the muscles and sinews and bones in a human old age. It is but the lapse of the longer periods of decay, which in the sight of their Creator distinguishes the duration of the mountain from that of the moth or worm.

By our bountiful Father of Mercies mountain ranges are appointed to fulfil their offices with a view to preserving health and thus increase the happiness of the human race in general. The first of these uses is to give motion to water. Every fountain and river, from the shallow streamlet that crosses the road in trembling clearness, to the calm and silent movings of the Potomac, the James, or the Ohio, all owe their motion, purity, and resistless sweeping powers to the elevations of the earth ordained for that purpose. Gentle or steep, extended or abrupt, some determined slope of the surface is essential before the waters of any stream could overtake and refresh a single plant or tree after the long pilgrimage by clouds from the Southern Pacific Ocean.

We are living among the highlands, a veritable good-

ly land of the sky, where we may walk and meditate beside the grassy or flowery margins of our mountain streams, what opportunities we have to consider how beautiful and very wonderful is that arrangement, in virtue of which the dews and rains falling to the ground should find no resting place to loiter after coming so far away, but should find instead, prepared and fixed channels traced for them, from the ravines of the central crests, down which they rush and roar in turbulent ranks of foam, towards the dark hollows beneath the banks of lowland meadows, pastures, and planted fields, round which they must circle among the stems and beneath the leaves of the growing plants, so essential to human comfort and enjoyable existence.

These pathways for the dews and rains and melted snows are so arranged that by some definite rate of movement the waters must evermore descend, sometimes slow, sometimes swift, but never pausing. The daily existances they must glide over being marked out for them at each successive rising of the sun, or dawning of the morning, the place that knew them yesterday to know them no more, and the gateways of guarding mountains opened for them in cleft, or chasm, or duly tunnelled. Thus nothing is to hinder them in their mission to the growing, life-sustaining fruits, grasses, and grains, while from afar the great heart of the parent ocean seems to be ever calling these blessing-imparting waters back to herself, as if "deep were calling unto deep."

It is well to remember, too, that this office of imparting motion to water is not exhausted on the sur-

face, for a no less important office of the hills is to direct the flow of springs and fountains from subterranean reservoirs. While it may seem marvelous to see the waters coming up out of the ground beneath our feet, yet this is no miraculous happening, for every fountain and well are supplied from a reservoir somewhere in the hidden chambers of the hills, so located as to involve some degree of fall, assuring pressure sufficient to secure the constant outflowing of the stream.

The second use of mountains is to keep up a constant change in the nature and currents of the air. A difference in soils and vegetation would have in a measure caused changes in the air, even if the earth had been level. This change would have been far less than what is caused now by the chains of hills, which divide the earth not only into districts but into climates, and cause perpetual currents of air to traverse their passes in a thousand different states, by moistening with the spray of waterfalls, beating the air hither and thither in the pools of rushing torrents, closing the air within clefts and caves where the sunbeams are never seen, and all becomes cold as autumn mists. By means of the hills this cooled air is sent forth again to breathe lightly across the velvet fields of grass upon the slopes, or be scorched among sunburned shales and grassless crags, and then when pierced by strange electric darts flashes of mountain fire, the air is suffered to depart at last, chastened and pure, to refresh the far away arid plains.

The third important office of the mountains is to

bring about perpetual change in the soils. Were it not for this office cultivated ground would in a series of years be exhausted and would require to be upturned most laboriously by human appliances. Elevations provide for this a constant renovation. The higher mountains suffer their summits to be broken into fragments and to be cast down in sheets of mossy rock, replete with every ingredient needful for the nutriment of plant life. These fallen fragments broken by frosts and disentegrated by torrents into various conditions of sand and clay—materials which are distributed perpetually by the streams farther and farther from the mountain base. The turbid foaming of angry looking waters in time of flood, tearing down banks and rocks are not disturbances of the beneficent course of nature, but are operations of laws necessary to the existence of man and to make the earth beautiful. This process may be carried on more gently, but not less effectively, over the entire surface of the lower undulating districts. Each filtering thread of summer rain trickling through the short turf of the uplands is bearing its own appointed burden of earth to be thrown on some new natural garden for some one to work and enjoy long years in the future.

Of all the good and perfect gifts lavished upon a bit of goodly land, it would be difficult to find anything more suggestive of edifying thought than the grass of the field. It is something mysterious to examine not only when gemmed with the dew drops of morning, or quivering in the mirage of noon, but with the sparkling threads of aborescence, "each a little belfry of

grain bells all achime." When a single blade of grass is plucked, one of countless millions, and one examines intently for a time its narrow sword shaped strip of fluted green, nothing is perceived of notable goodness or entrancing beauty. In that blade of grass may be noticed very little that is strong and a very little tallness and a few delicate lines meeting in a dull unfinished point. So the blade of grass by no means appears to be a creditable or much cared for sample of the Creator's workmanship, made to be trodden upon by men or roaming beast, a little pale hollow stalk feble and flaccid leading down to the dull brown fibres of roots. And yet when we carefully ponder over its uses and the place grass occupies in promoting man's physical good, we are inclined to the opinion and so express ourselves that of all the gorgeous flowers that bloom in our mountain air and shed their balmy fragrance upon the summer breezes, and of all the strong and goodly trees, pleasant to the eyes or good for food, like stately palms and towering pines, strong oaks and ash trees, scented orchards, or gracefully burdened vines, there is not one so universally loved and sought after by mankind of every clime and nation, or by the Creator so highly graced as that narrow point of feeble green—a blade of grass.

For floral scenery our Pocahontas forests, in the season of wild flowers, are as enchanting as fairy dreams. The dogwood and the service bloom,—Indian sign for planting corn, the Shawnee Flower, rivaling the magnolia of the far South; the notable variety of honey-

suckle blooms, so warmly recommended by ardent admirers as most suitable for the West Virginia state emblematic flower; rhodadendron and ivy, along with so many curious flowering plants, open up vistas of surpassing loveliness.

Exotic flowers have been cultivated with notable success. The first rose geranium ever potted in our county was brought to Huntersville by Miss Margaret Ann Craig, from Waynesboro, Va., about the year 1843. It flourished nicely, and she was very generous in giving away the slips. She carried it on horseback, in her hand, a tiny slip, clipped off with scissors, slit at the end and kept open by inserting an oat grain, wrapped in moistened paper. This wrapping was moistened every few hours at some spring or brook by the wayside, during that journey of nearly a hundred miles.

Flowers are seemingly intended for the solace of humanity, of all age., classes, and conditions. Little children and quietly contented people love flowers as they bloom in forests, lawns, or gardens. Luxurious and pleasure loving persons rejoice in flowers when gathered for some festive occasion. The flowers are the home-loving rural cottagers treasure, while in towns and villages a few flowers adorn as with scraps of rainbow the windows of the toiling inmates, in whose souls linger a longing for the covenanted place of Divine care, of which the lily and the rose are the emblems.

Notwithstanding this general admiration for flowefs, the writer feels inclined to make this criticism at a venture, that were this apparent love of flowers thoroughly probed there are but few people, compara-

tively care about flowers as flowers. Many indeed are fond of finding a new shape of blossom, thus caring for the shape as the little boys care for the kaleidoscope. Many may like a pretty display of flowers on the benches or in the pit, as they admire a fine service of silver or gold plate on the table. Many are scientifically interested in flowers, though the interest of these scientists may be in the nomenclature rathen than the flowers themselves, and some enjoy them as they grow in their gardens like radishes and peas.

Being persuaded as I am that I shall have among my readers some young people who are thoughtful, observing and inquiring in their character, I would write something about the stones that are so very plentiful in our county for their special consideration. Shakespeare, the foremost of all names in English literature, speaks of a cast of intelligence or intellectual culture that enables one so cultivated to see sermons in stones and good in everything. There are but few, if any natural, objects from which more can be learned than from stones, as they seem so well fitted to reward all patient, intelligent observers. As to other objects in creation nearly all can be seen to some gratifying degree by the hasty impatient observer whose glances must be transient, on the spur of the passing moment or not at all. They have no patience with the objects unless they are pleasant in being hastily seen. Trees, clouds, cliffs and rivers are highly enjoyable even by careless observers in being, but the stones over which they walk have for the careless nothing in them

but stumbling and objects of offense. No pleasure is languidly to be derived of the stones as from clusters on the vines or fruits on the overshadowing boughs. Impatient observers find nothing delicious to their tastes or good of any kind in stones. Even to the patiently studious at first sight all that the stones seem good for is to symbolize the hard heart and unfatherly gift referred to in our Lord's question, "Will a father give his famishing son a stone in place of bread?"

But yet when some of my younger readers will do as I confidently anticipate they will, and give the stones their thoughtful reverent consideration they will to their pleasure find in stones more bread or food for thought than in any other lowly feature of all our interesting Pocahontas landscape. For a stone when duly examined will be found to be a mountain in miniature, as a sparkling drop of dew may be regarded as a miniature sun. The fineness of the Creator's work is so exquisite that in a single stone a foot or more in diameter may be compressd as many changes of form and structure on a small scale as have been needed for mountains on a large scale. When moss is taken for forests, grains of chrstal for crags, the surface of a stone, in by far the most instances, is more pleasingly interesting than the surface of an ordinary mountain by reason of more fantastic forms and richer colors. The moss does not conceal the form of the rock but gathers over it in little brown bunches like pin cushions made by mixed threads of dark ruby silk and gold, rounded over more subdued films of white and gray, with lightly crisped and curled edges, like

autumn frost on fallen leaves, and minute clusters of upright orange stalks with pointed caps; and fibres of deep green, gold and faint purple passing into black, and following with unimaginable fineness of gentle growth the undulations of the stone until the stone is so fully charged with color it can receive no more. Then in place of looking rugged or cold or stern or anything a rock is held to be at heart, the moss makes it appear clothed with a soft dark robe, embroidered with arabesque of purple and silver. Though the moss be so meek in character, yet it was the first of Heavens mercies visible to our earth, at the opening of the redemptive ages referred to elsewhere, veiling, as it did, with silent softness, the first dintless rock. Moss is the most significant emblem of pity for the ruined, covering as it did with strange and tender honor the scarred disgrace of ruin, and laying quiet finger on the heaving, trembling stones to teach them rest, in which they now repose. Words have not been coined to express really what the mosses are. No known words are delicate enough, perfect enough, or rich enough in their diction and significance to express what should be told of the rounded mosses of furred and radiant green, the starred divisions of rubied bloom, fine filmed as is the spirit could spin porphyry, as glass is spun with seemingly magic skill. Where can the phrases be found in oratory or poetry to describe properly the traceries of intricate silver and fringes of amber, lustrous, arborescent, burnished through every fibre into fitful brightness and glory, traverses of silken change, yet all subdued pensive, and framed for simplest offices

of graceful duty. The mosses will not be gathered, like the flowers, for May Queen crowns, or tokens of incipient love as the buds are, but of the mosses the wild birds make their nests, and wearied children their pillow. As the earth's first mercy, so the mosses are the earth's last gift to her departed children. When all other service is hopeless and vain from plant and tree, the soft moss and gray lichen take up their watch by the tombstone and the burial mound. The woods, the flowers, the gift bearing grapes and cereals did their offices for a time, but the lichen and the moss do service forever. Trees for the builder's use, flowers for the bridal altar, cereals for the table, mosses for the grave.